AMENDMENTS TO THE DRAWINGS

The attached sheet(s) of drawings includes changes to Figures 1-4 so that numbers and reference characters are oriented in the same direction as the view, pursuant to 37 CFR §1.84(p)(1). The term "Replacement Sheet" has also been removed from the Figure label and moved to the top margin of the Figures 1-4.

Attachment: Replacement sheets, Figures 1-4

REMARKS

Reconsideration of this application is requested. Claims 1-10 were previously pending. Claim 4 has been allowed. Accordingly, claims 1-3 and 5-10 are pending and at issue.

Applicants acknowledge with appreciation the finding that claim 4 has been allowed.

Rejection Under 35 U.S.C. §112, first paragraph

Claims 5 and 7 stand rejected as not enabled. The Examiner states that claimed subject matter was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention since the meaning of Reynold's Factor and bm^3/h are not explained in the specification.

Applicants respectfully note that the specification need not disclose what is well known in the art and preferably omits that which is well-known to those skilled and already available to the public. *In re Buchner*, 929 F.2d 660, 661 (Fed. Cir. 1991). The terms "Reynolds Factor" and 'bm^3/h" are both well known in the art.

The term "Reynolds Factor" refers to a parameter that discussed the degree of turbulence in a liquid or gaseous stream. This parameter is defined in various engineering texts (see, e.g., Transport Processes and Unit Operations, 3rd ed., p. 49-50 (1993) which provides a formula to estimate the Reynold's number under certain conditions---attached as Exhibit A). The term "bm^3/h" refers to operational cubic meters per hours. This term accounts for the fact that the standard cubic meter is technically only valid at a specified temperature, and that a gaseous volume will change with changes in temperature and pressure. Like the Reynold's number, "Bm^3/h" is a term commonly used in industry and well known to persons of ordinary skill in the art (See Exhibits B and C).

Rejection Under 35 U.S.C. § 112, second paragraph

Claim 9 stands rejected as indefinite. The Examiner states that the term "largely retained" is a relative term. Claim 9 has been amended to recite that "the filter-moist aluminum hydroxide d_{50} grain distribution is within about 15% of its original value...". This is supported by Table 1 on page 9 of the application, in which the d_{50} grain size of Product A (aluminum hydroxide treated according to present application) is within about 15% of the d_{50} grain size distribution of Product B (untreated aluminum hydroxide); i.e., 1.2 μm vs. 1.4 μm.

Claims 5-7, 9 and 10 stand rejected. The Examiner states that there is insufficient antecedent basis for the numerical limitations recited in these claims. Applicants have amended the specification to include literal support for the limitations recited in the claims as originally filed.

Claim Rejections Under 35 U.S.C. §§102 and 103

Claims 1-3 and 10 stand rejected as anticipated by Bongartz (U.S. Patent No. 5,127,950) or Ricoh KK (Japanese Publication No. 63-139363). Claims 1-3, 8 and 10 stand rejected as obvious over Bongartz or Ricoh KK in view of CN 87107410 or GB2231333.

The Examiner states that Bongartz discloses an aluminum hydroxide having a BET specific surface area between 3 and 9 m^2/g, preferably 4 and 6 m^2/g and an average grain diameter of 0.5-1.1 microns. The Examiner also states that Ricoh KK teaches aluminum hydroxide particles having a BET specific surface area of less than 20 m^2/g and an average grain size of 0.1-5 microns. The Examiner states that the presence of Boehmite, the oil absorption, the water absorption, and the melt flow index are inherent in the composition; and the residual moisture is conventional.

Applicants respectfully disagree with the Examiner's rejection, particularly the assertion that the residual moisture, oil absorption and water absorption in claim 1 are inherently found in aluminum hydroxides of the prior art. In table 1, Applicants have compared, to the Applicant's knowledge, the closest aluminum hydroxides of the prior art to the inventive

aluminum hydroxide (Product A). There it is shown that the oil absorption of the comparative products is reduced by at least 20% over comparative Product B, and reduced by about 40% over comparative Product D.

Similarly water absorption values for the aluminum hydroxides of the present invention are superior to those found in aluminum hydroxides of the prior art. This is shown graphically in Figure 1 of the present application. Furthermore, the presence of Boehmite is not an inherent feature of these hydroxides (see claim 2). Figure 3 and Table 5 indicate that the MFI of the inventive product significantly exceed the MFI of products of the prior art (see claim 10).

Applicants have found that the parameters recited in claims 1, such as oil absorption reduction discussed above, cannot be obtained by optimization of BET or grain size parameters. Nor can such parameters be obtained from, for example, the Bayer-process which is used to prepare the aluminum hydroxides in Bongartz (see U.S. Patent No. 5,127,950 at col.2, ll. 68). The Bayer process is a typical mode of manufacture of aluminum hydroxides of the prior art, and is similar in nature to Comparative products B, C, and D -- discussed above and in Table 1. (Applicants note that the aluminum hydroxides disclosed in Ricoh KK (Japanese Publication No. 63-139363) are for a toner composition, not a flame retardant polymer composition. The hydroxides or Ricoh KK are not as valid for comparative purposes as the hydroxides in Bongartz and comparative products B, C and D.)

Instead, the parameters called for by claim 1 may be obtained by means of the process recited in claim 4 (which the Examiner has allowed). Based on the data set forth in Tables 1 and 5 of the application comparing the closest prior art, applicants submit that the properties recited in claim 1 are not inherent in, and are novel and non-obvious over the cited prior art.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: April 6, 2006

Respectfully submitted,

By ____________________

Jason C. Chumney
Registration No.: 54,781
DARBY & DARBY P.C.
P.O. Box 5257
New York, New York 10150-5257
(212) 527-7700
(212) 527-7701 (Fax)
Attorneys/Agents For Applicant

Attachments

As the velocity was increased, it was found that at a definite velocity the thread of dye became dispersed and the pattern was very erratic, as shown in Fig. 2.5-lb. This type of flow is known as turbulent flow. The velocity at which the flow changes is known as the *critical velocity*.

2.5C Reynolds Number

Studies have shown that the transition from laminar to turbulent flow in tubes is not only a function of velocity but also of density and viscosity of the fluid and the tube diameter. These variables are combined into the Reynolds number, which is dimensionless.

$$N_{Re} = \frac{Dv\rho}{\mu} \tag{2.5-1}$$

where N_{Re} is the Reynolds number, D the diameter in m, ρ the fluid density in kg/m^3, μ the fluid viscosity in Pa · s, and v the average velocity of the fluid in m/s (where average velocity is defined as the volumetric rate of flow divided by the cross-sectional area of the pipe). Units in the cgs system are D in cm, ρ in g/cm^3, μ in g/cm · s, and v in cm/s. In the English system D is in ft, ρ in lb$_m$/ft^3, μ in lb$_m$/ft · s, and v in ft/s.

The instability of the flow that leads to disturbed or turbulent flow is determined by the ratio of the kinetic or inertial forces to the viscous forces in the fluid stream. The inertial forces are proportional to ρv^2 and the viscous forces to $\mu v/D$, and the ratio $\rho v^2/(\mu v/D)$ is the Reynolds number $Dv\rho/\mu$. Further explanation and derivation of dimensionless numbers is given in Section 3.11.

For a straight circular pipe when the value of the Reynolds number is less than 2100, the flow is always laminar. When the value is over 4000, the flow will be turbulent, except in very special cases. In between, which is called the *transition region*, the flow can be viscous or turbulent, depending upon the apparatus details, which cannot be predicted.

EXAMPLE 2.5-1 Reynolds Number in a Pipe
Water at 303 K is flowing at the rate of 10 gal/min in a pipe having an inside diameter (ID) of 2.067 in. Calculate the Reynolds number using both English units and SI units.

Solution: From Appendix A.1, 7.481 gal = 1 ft^3. The flow rate is calculated as

$$\text{flow rate} = \left(10.0\,\frac{\text{gal}}{\text{min}}\right)\left(\frac{1\ \text{ft}^3}{7.481\ \text{gal}}\right)\left(\frac{1\ \text{min}}{60\ \text{s}}\right) = 0.0223\ \text{ft}^3/\text{s}$$

$$\text{pipe diameter, } D = \frac{2.067}{12} = 0.172\ \text{ft}$$

$$\text{cross-sectional area of pipe} = \frac{\pi D^2}{4} = \frac{\pi(0.172)^2}{4} = 0.0233\ \text{ft}^2$$

$$\text{velocity in pipe, } v = \left(0.0223\,\frac{\text{ft}^3}{\text{s}}\right)\left(\frac{1}{0.0233\ \text{ft}^2}\right) = 0.957\ \text{ft/s}$$

From Appendix A.2 for water at 303 K (30°C),

$$\text{density, } \rho = 0.996(62.43)\ \text{lb}_m/\text{ft}^3$$

$$\text{viscosity, } \mu = (0.8007\ \text{cp})\left(6.7197 \times 10^{-4}\,\frac{\text{lb}_m/\text{ft}\cdot\text{s}}{\text{cp}}\right)$$

$$= 5.38 \times 10^{-4}\ \text{lb}_m/\text{ft}\cdot\text{s}$$

Substituting into Eq. (2.5-1),

$$N_{Re} = \frac{Dv\rho}{\mu} = \frac{(0.172 \text{ ft})(0.957 \text{ ft/s})(0.996 \times 62.43 \text{ lb}_m/\text{ft}^3)}{5.38 \times 10^{-4} \text{ lb}_m/\text{ft}\cdot\text{s}}$$

$$= 1.905 \times 10^4$$

Hence, the flow is turbulent. Using SI units,

$$\rho = (0.996)(100 \text{ kg/m}^3) = 996 \text{ kg/m}^3$$

$$D = (2.067 \text{ in.})(1 \text{ ft}/12 \text{ in.})(1 \text{ m}/3.2808 \text{ ft}) = 0.0525 \text{ m}$$

$$v = \left(0.957 \frac{\text{ft}}{\text{s}}\right)(1 \text{ m}/3.2808 \text{ ft}) = 0.2917 \text{ m/s}$$

$$\mu = (0.8007 \text{ cp})\left(1 \times 10^{-3} \frac{\text{kg/m}\cdot\text{s}}{\text{cp}}\right) = 8.007 \times 10^{-4} \frac{\text{kg}}{\text{m}\cdot\text{s}}$$

$$= 8.007 \times 10^{-4} \text{ Pa}\cdot\text{s}$$

$$N_{Re} = \frac{Dv\rho}{\mu} = \frac{(0.0525 \text{ m})(0.2917 \text{ m/s})(996 \text{ kg/m}^3)}{8.007 \times 10^{-4} \text{ kg/m}\cdot\text{s}} = 1.905 \times 10^4$$

2.6 OVERALL MASS BALANCE AND CONTINUITY EQUATION

2.6A Introduction and Simple Mass Balances

In fluid dynamics fluids are in motion. Generally, they are moved from place to place by means of mechanical devices such as pumps or blowers, by gravity head, or by pressure, and flow through systems of piping and/or process equipment. The first step in the solution of flow problems is generally to apply the principles of the conservation of mass to the whole system or to any part of the system. First, we will consider an elementary balance on a simple geometry, and later we shall derive the general mass-balance equation.

Simple mass or material balances were introduced in Section 1.5, where

$$\text{input} = \text{output} + \text{accumulation} \qquad \textbf{(1.5-1)}$$

Since, in fluid flow, we are usually working with rates of flow and usually at steady state, the rate of accumulation is zero and we obtain

$$\text{rate of input} = \text{rate of output (steady state)} \qquad \textbf{(2.6-1)}$$

In Fig. 2.6-1 a simple flow system is shown where fluid enters section 1 with an

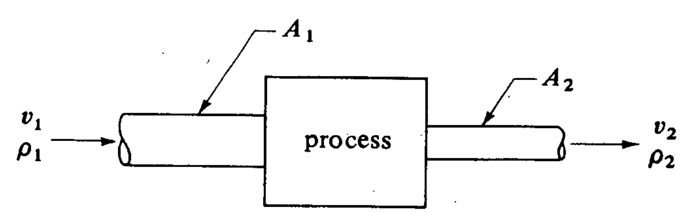


FIGURE 2.6-1. *Mass balance on flow system.*

MANKENBERG
INDUSTRIAL VALVES

Pressure Reducer
Overflow Valves
Vacuum Valves
Safety Valves
Bleeding/Venting Valves
Float Valves
Steam Traps
Flow Indicators
Filters / Strainer

Contact
Technic
About us
Downloads
Impressum

My enquiry

enquiry safety valves

Personal details

company		name	
street/no.		department	
postcode/town		tel.	
country		fax	
industry		email	
no. of employees		web -site	

My requirment for:

enquiry, description, project

Operating conditions:

Set pressure p		barg*		
flow rate steam		○ kg/h	○ m^3/h	
flow rate liquids		○ l/h	○ kg/h	○
flow rate gases		○ Nm^3/h	○ Bm^3/h with	
temperature		°C		

* All pressures quoted are above atmospheric pressure. Absolute pressures must be marked "bara".
Nm3/h = cubic metres at atmospheric pressure
Bm3/h =cubic metres at operating pressure (please state pressure)

My medium

description	
spec. wight kg/m^3 (with liquids)	
Molar mass M kg/kmol (with gases)	
isentropic exponent k at 1 bar, 0°C (with gases)	

My special requirements:

valve body material	
elastomer-material	
connection (DIN, ANSI, JIS, NPT ...)	
required nominal diameter	
acceptance specifications	

My special remarks:

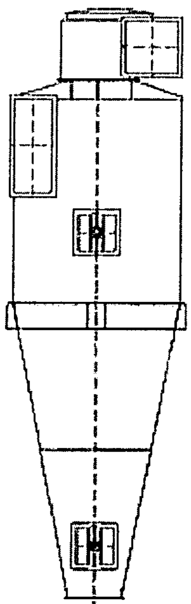
C

Filters / Separators
Impulse Filter
Electrostatic precipitators
Centrifugal and gravity...
Cyclones, Multi-cyclones
Classifying devices
Washer/Scrubber systems
Radial fans
Cooling systems
Process measuring and control...
Conveying and discharge devices
Pipes / Ducts
Noise reduction and safety...

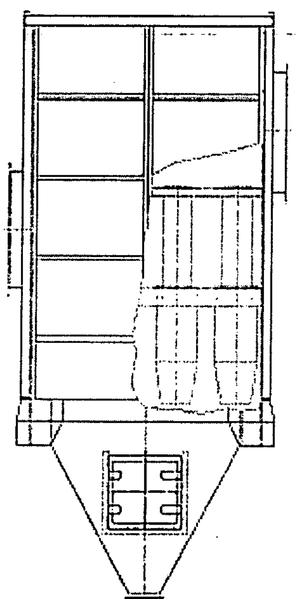
CENTRIFUGAL AND GRAVITY SEPARATOR
CYCLONES, MULTI-CYCLONE

For simple dust removal and preseparation

This category comprises all mechanical separators used for the simple removal of dust and separation ol particles from the exhaust gases created by combustion processes. Included are tangential cyclones, spa and rotary separators, and axial and multi-cyclone units. This technology is used above all to provide spa protection in fabric filter plants.



Cyclones Air quantities from 600 Bm3/h to 225,000 Bm3/h, broad application ran through 5 basic types classified according to the separation task and existing pressure or pressure loss, choice of materials for different applications, many different types of anti-wear protection available.



Multi-cyclones The multi-cyclone is used for the dry separation of dust and gases. It consists of a specified number of separating elements th are mounted in a common housing. The multi-cyclone is used as a separator or pre-separator in biomass-fired heating plants, scrap wooc incineration plants, sewage sludge processing and other applications. Air-handling capacities range from 1,500 Bm3/h to 200,000 Bm3/h.

BEST AVAILABLE COPY